

**CPC****COOPERATIVE PATENT CLASSIFICATION****C23F**

**NON-MECHANICAL REMOVAL OF METALLIC MATERIAL FROM SURFACE** (working metal by laser beams [B23K 26/00](#); desurfacing by applying flames [B23K 7/00](#); working of metal by electro-erosion [B23H](#); producing decorative effects by removing surface material, e.g. by engraving, by etching, [B44C 1/22](#); electrolytic etching or polishing [C25F](#)); **INHIBITING CORROSION OF METALLIC MATERIAL OR INCRUSTATION IN GENERAL; MULTI-STEP PROCESSES FOR SURFACE TREATMENT OF METALLIC MATERIAL INVOLVING AT LEAST ONE PROCESS PROVIDED FOR IN CLASS C23 AND AT LEAST ONE PROCESS COVERED BY SUBCLASS C21D OR C22F OR CLASS C25.**

**NOTE**

protective layers or coating compositions or methods of applying them; these are classified in the appropriate places, e.g. [B05](#), [B44](#), [C09D](#), [C23C](#).

mechanical devices or constructional features of particular articles for inhibiting incrustation; these are classified in the appropriate places, e.g. in pipes or pipe fittings [F16L 58/00](#).

articles characterised by being made of materials selected for their properties of resistance to corrosion or incrustation; these are classified in the appropriate places, e.g. turbine blades [F01D 5/28](#).

**C23F 1/00**

**Etching metallic material by chemical means** (manufacture of printing surfaces [B41C](#); manufacture of printed circuits [H05K](#))

## C23F 1/02

. Local etching

## C23F 1/04

.. Chemical milling

## C23F 1/06

. Sharpening files

## C23F 1/08

. Apparatus, e.g. for photomechanical printing surfaces (photo- mechanical reproduction [G03F](#))

## C23F 1/10

. Etching compositions ([C23F 1/44](#) takes precedence)

## C23F 1/12

.. Gaseous compositions

## C23F 1/14

.. Aqueous compositions

## C23F 1/16

... Acidic compositions ([C23F 1/42](#) takes precedence)

## C23F 1/18

.... for etching copper or alloys thereof

## C23F 1/20

.... for etching aluminium or alloys thereof

## C23F 1/22

.... for etching magnesium or alloys thereof

## C23F 1/26

.... for etching refractory metals

## C23F 1/28

.... for etching iron group metals

- C23F 1/30 . . . . for etching other metallic material
- C23F 1/32 . . . Alkaline compositions ([C23F 1/42](#) takes precedence)
- C23F 1/34 . . . . for etching copper or alloys thereof
- C23F 1/36 . . . . for etching aluminium or alloys thereof
- C23F 1/38 . . . . for etching refractory metals
- C23F 1/40 . . . . for etching other metallic material
- C23F 1/42 . . . containing a dispersed water-immiscible liquid
  
- C23F 1/44 . Compositions for etching metallic material from a metallic material substrate of different composition
  
- C23F 1/46 . Regeneration of etching compositions

### **C23F 3/00      Brightening metals by chemical means**

- C23F 3/02 . Light metals
- C23F 3/03 . . with acidic solutions
  
- C23F 3/04 . Heavy metals
- C23F 3/06 . . with acidic solutions

### **C23F 4/00      Processes for removing metallic material from surfaces, not provided for in group [C23F 1/00](#) or [C23F 3/00](#)**

- C23F 4/02 . by evaporation
  
- C23F 4/04 . by physical dissolution

### **C23F 11/00      Inhibiting corrosion of metallic material by applying inhibitors to the surface in danger of corrosion or adding them to the corrosive agent (adding inhibitors to mineral oil, fuels, or lubricants [C10](#); adding inhibitors to pickling solutions [C23G](#))**

- C23F 11/02 . in air or gases by adding vapour phase inhibitors
  
- C23F 11/04 . in markedly acid liquids
  
- C23F 11/06 . in markedly alkaline liquids
  
- C23F 11/08 . in other liquids
- C23F 11/10 . . using organic inhibitors

#### **NOTE**

A compound is classified in the last appropriate place.

Esters or anhydrides of organic acids are classified as the relevant acid unless otherwise indicated. Salts of a compound with an inorganic compound are classified as that compound unless specifically provided for.

C23F 11/12	...	Oxygen-containing compounds
C23F 11/122	....	Alcohols; Aldehydes; Ketones
C23F 11/124	....	Carboxylic acids
C23F 11/126	.....	Aliphatic acids
C23F 11/128	....	Esters of carboxylic acids
C23F 11/14	...	Nitrogen containing compounds
C23F 11/141	....	Amines; Quaternary ammonium compounds
C23F 11/142	.....	Hydroxy amines
C23F 11/143	.....	Salts of amines
C23F 11/144	....	Aminocarboxylic acids
C23F 11/145	....	Amides; N-substituted amides
C23F 11/146	....	containing a multiple nitrogen-to-carbon bond
C23F 11/147	....	containing a nitrogen-to-oxygen bond
C23F 11/148	....	containing a nitrogen-to-nitrogen bond
C23F 11/149	....	Heterocyclic compounds containing nitrogen as hetero atom
C23F 11/16	...	Sulfur containing compounds
C23F 11/161	....	Mercaptans
C23F 11/162	....	Thioaldehydes; Thioketones
C23F 11/163	....	Sulfonic acids
C23F 11/164	....	containing a -SO <sub>2</sub> -N group
C23F 11/165	....	Heterocyclic compounds containing sulfur as hetero atom
C23F 11/167	...	Phosphorus-containing compounds
C23F 11/1673	....	Esters of phosphoric or thiophosphoric acids
C23F 11/1676	....	Phosphonic acids
C23F 11/173	...	Macromolecular compounds
C23F 11/18	..	using inorganic inhibitors
C23F 11/181	...	Nitrogen containing compounds
C23F 11/182	...	Sulfur, boron or silicon containing compounds
C23F 11/184	...	Phosphorous, arsenic, antimony or bismuth containing compound
C23F 11/185	...	Refractory metal-containing compounds
C23F 11/187	...	Mixtures of inorganic inhibitors
C23F 11/188	....	containing phosphates

## **C23F 13/00      Inhibiting corrosion of metals by anodic or cathodic protection**

C23F 13/005	.	{Anodic protection}
C23F 13/02	.	cathodic; Selection of conditions, parameters or procedures for cathodic protection, e.g. of electrical conditions
C23F 13/04	..	Controlling or regulating desired parameters
C23F 13/06	..	Constructional parts, or assemblies of cathodic-protection apparatus
C23F 13/08	...	Electrodes specially adapted for inhibiting corrosion by cathodic protection; Manufacture thereof; Conducting electric current thereto

C23F 13/10	....	Electrodes characterised by the structure ( <a href="#">C23F 13/16 takes precedence</a> )
C23F 13/12	....	Electrodes characterised by the material ( <a href="#">C23F 13/16 takes precedence</a> )
C23F 13/14	.....	Material for sacrificial anodes
C23F 13/16	....	Electrodes characterised by the combination of the structure and the material
C23F 13/18	....	Means for supporting electrodes
C23F 13/20	....	Conducting electric current to electrodes
C23F 13/22	....	Monitoring arrangements therefor

**C23F 14/00**      **Inhibiting incrustation in apparatus for heating liquids for physical or chemical purposes** ([adding scale preventives or removers to water C02F 5/00](#))[{inhibiting incrustation in polymerisation reactors C23F 15/005}](#)

C23F 14/02      .    by chemical means

**C23F 15/00**      **Other methods of preventing corrosion or incrustation**

C23F 15/005      .    [{Inhibiting incrustation}](#)

**C23F 17/00**      **Multi-step processes for surface treatment of metallic material involving at least one process provided for in class [C23](#) and at least one process covered by subclass [C21D](#) or [C22F](#) or class [C25](#)([C23C 28/00 takes precedence](#))**

**C23F 2201/00**      **Type of materials to be protected by cathodic protection**

C23F 2201/02      .    Concrete, e.g. reinforced

**C23F 2213/00**      **Aspects of inhibiting corrosion of metals by anodic or cathodic protection**

C23F 2213/10	.    Controlling or regulating parameters
C23F 2213/11	..    for structures subject to stray currents
C23F 2213/20	.    Constructional parts or assemblies of the anodic or cathodic protection apparatus
C23F 2213/21	..    combining at least two types of anodic or cathodic protection
C23F 2213/22	..    characterized by the ionic conductor, e.g. humectant, hydratant or backfill
C23F 2213/30	.    Anodic or cathodic protection specially adapted for a specific object
C23F 2213/31	..    Immersed structures, e.g. submarine structures
C23F 2213/32	..    Pipes